

ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

JUL 29 1993

In the Matter of

Amendment of Part 90 of the
Commission's Rules to Adapt
Regulations for Automatic

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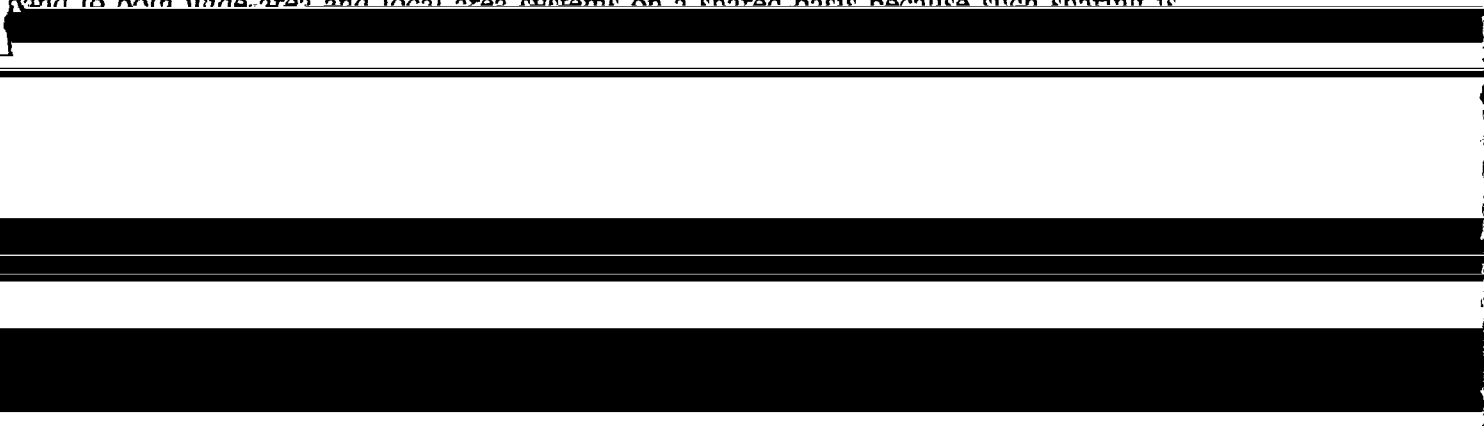
PR Docket No. 93-61

SUMMARY

Pinpoint Communications, Inc. ("Pinpoint") respectfully reasserts its central argument in its initial comments on the Commission's Notice of Proposed Rulemaking ("NPRM") to adopt permanent rules for Location and Monitoring Service ("LMS" formerly termed Automatic Vehicle Monitoring or "AVM"): spectrum sharing by pulse-ranging wide area licensees is both possible and in the public interest.

Notwithstanding the fact that the Commission essentially agrees with this point, and despite its own statements in another proceeding advocating the public interest benefits of open entry licensing, PacTel has opposed sharing in favor of a grant of exclusivity for itself. As the record reflects, however, a grant of exclusivity, even on a temporary basis, would disserve the public interest by precluding future spectrum sharing for AVM/LMS. Competition, technological innovation, expanded consumer choice, and the realization of important national transportation policies would be precluded. Moreover, the exclusivity proposal would run afoul of the venerable *Ashbacker* doctrine by depriving competing AVM interests of their "hearing" and due process rights, as well as abrogating fundamental principles of fairness and the public interest imperative that govern the licensing process.

As the record reveals, the Commission should open the entire 902-928 MHz band to both wide-area and local area systems on a shared basis because such sharing is



making sharing among wide-area and local-area AVM systems feasible.

This sharing plan, however, need not alter the regulatory status of amateurs and Part 15 unlicensed devices. Given the technical and operational characteristics of these devices, as well as wide-area systems, continued sharing of the band is wholly reasonable.

Finally, the Commission should reject the request of Radian Corporation to contemplate its request for a non-government wind profiler allocation at 915 MHz simultaneous with its execution of new AVM/LMS rules. Because the need for these wind profilers, as well as their interference potential to existing users of the 902-928 MHz band is unknown, the Commission should delay its consideration of this proposal.

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Amendment of Part 90 of the Commission's Rules to Adapt Regulations for Automatic Vehicle Monitoring Systems

PR Docket No. 93-61

Pinpoint Communications, Inc. ("Pinpoint"), by its attorneys, hereby submits its reply comments in the above-captioned proceeding.

In its opening comments in response to the *NPRM*, Pinpoint, alone among the commenters that have developed wide-area automatic vehicle monitoring ("AVM") technologies, engaged the central issue put forth by the Commission in the Notice of Proposed Rulemaking for wide-area systems: *whether* sharing through "cooperation among co-channel [pulse-ranging wide-area] licensees serving the same area" is possible.¹ Other wide-area system licensees, having the potential for retroactive exclusive licensing that would exempt them from the need to subject their products to a competitive marketplace, chose to take it as a given that sharing was impossible and

¹ *Regulations for Automatic Vehicle Monitoring Systems*, 8 F.C.C. Red 2502, 2506 (1993) ("*NPRM*").

sought to rationalize why. Despite their self-interested efforts, it is clear that sharing is possible, is immediately feasible, and in the public interest. As amplified further herein and in the attached Technical Appendix, the field results from Pinpoint's experimental operations offer lucid and convincing evidence that sharing can be achieved in the manner suggested by Pinpoint.

Sharing will provide important benefits to the American public, as the *NPRM* recognized. North American Teletrac and Location Technologies, Inc., through their joint venture, PacTel Teletrac ("PacTel"), contend otherwise. Yet, in recent comments filed in PR Docket No. 93-144, where the Commission is proposing to confer only on *existing* 800 MHz Specialized Mobile Radio ("SMR") Service licensees the initial opportunity for an Expanded Mobile Service Provider license, PacTel expressed strong support for open-entry and competition. Specifically, PacTel Paging forcefully declared a concern:

. . . that an 800 MHz SMR licensing scheme that provides a *de jure* licensing preference to incumbent license holders may not serve the public interest. The public interest is better served by adopting policies which permit open entry and full competition.²

PacTel Paging continued by asserting that bestowing an exclusive privilege on a company solely because of when it became a licensee would constitute questionable policy and could stifle technological development:

The preference proposed here, however, is based solely upon the applicant being a licensee before a particular date. Indeed, this might

² Comments of PacTel Paging, PR Docket No. 93-144 at 5 (filed July 19, 1993) ("PacTel Paging Comments").

reward licensees who have not been at the forefront of development by allowing them to expand their systems without competition.³

These positions advanced by PacTel clearly apply to the band plans and licensing schemes being considered in this proceeding. Not only has PacTel Paging articulated sound policy, its comments in Docket 93-144 underscore the disingenuous motives underlying the hills of paper submitted by PacTel in this proceeding in support of retroactive exclusivity.

The *NPRM*'s alternative proposal to grant temporary exclusivity to existing wide-area licensees in 16 MHz of the band would grievously disserve the public interest. It would amount to permanent exclusivity, as the incumbents -- PacTel and MobileVision, L.P. ("MobileVision") -- would have no incentive to share in the future, as they have made abundantly clear. Indeed, the unprecedented manner of granting exclusivity that PacTel and MobileVision urge the Commission to adopt would violate the seminal teachings of *Ashbacker v. FCC*⁴ and run fundamentally contrary to the principles of fairness and the promotion of radio for the benefit of the public which underlie the Supreme Court's timeless admonitions in that case.

Further, the comments of PacTel repeatedly reinforce Pinpoint's demonstrations that maximization of the permissible bandwidth of pulse-ranging hyperbolic multilateration systems will support exponentially greater capacity and that co-existence

³ *Id.* at 5 n.11.

⁴ 326 U.S. 327 (1945).

with local-area systems is technically plausible. In short, the record, stripped of its rhetorical flourishes, supports Pinpoint's band plan counter-proposals: opening the entire 902-928 MHz band to all AVM operations, both wide-area and local-area systems, on a shared basis.⁵

Consistent with this conclusion, the Commission need not alter the status of this band for amateurs and Part 15 unlicensed devices. Wide-area systems can -- and should -- be designed to tolerate a reasonable amount of interference from Part 15 secondary uses, just as they must be able to co-exist with co-primary local-area AVM systems. Similarly, a blanket prohibition on amateur operations would be overly restrictive. The amateur community has a good record of compliance with Commission policies. If secondary and tertiary allocations are to work, licensees accorded a higher priority in the band should first work to implement operations that maintain a reasonable level of access to the band for lower priority users even though the latter are subject to the condition that interference be accepted by and not caused by them.

Finally, the Commission must not open the band to wind profilers absent more study of the same. While the sole commercial proponent of such systems, Radian Corporation, has supplemented its earlier filings in RM-8092 and Docket 93-59 with a modicum of additional information on its proposed systems, the prospects for serious interference-related mischief in this band from such operations remain real.

⁵ Pinpoint's full-sharing band plan proposals are attached hereto as Appendix A. As explained in Pinpoint's comments, the second plan incorporates quiet zones for wide-area systems using 4 MHz or less spectrum, such as PacTel, in which local-area AVM systems are subject to more restrictive power limits.

I. SHARING AMONG WIDE-AREA AVM SYSTEMS IS TECHNICALLY FEASIBLE WITHOUT UNDUE ECONOMIC CONSEQUENCES

In response to a central issue posed by the Commission in this proceeding, sharing among wide-area AVM systems is immediately feasible, both technologically and economically. But because sharing means competition, the other wide-area AVM proponents filing comments that are also existing licensees do their best to evade or distort the issue posed by the agency. These parties, in order to preserve their speculative edge, argue for two exclusive 8 MHz allocations in each market.

Southwestern Bell Mobile Systems ("SBMS"), which, like Pinpoint, has pending applications for wide-area system licenses, would expand the market to four entrants by dividing the proposed two 8 MHz wide-area sub-allocations into 4 MHz blocks. This would entail a serious compromise of the public benefits this band has to offer: with access only to a 4 MHz bandwidth, wide-area AVM systems would have such low capacity -- SBMS indicates that it will only be able to achieve 20 position fixes per second -- that they would be, for all practical purposes, incapable of any true IVHS applications.⁶ However, while SBMS threatens to trivialize AVM, its underlying inclinations are sound: competition among wide-area systems should be encouraged.

⁶ See, Technical Appendix, Response to Comments Filed in PR Docket No. 93-61, attached hereto as Appendix B and made a part hereof ("Technical Appendix"). The Technical Appendix was prepared by Louis H.M. Jandrell, Pinpoint's Vice President of Design and Development. Indeed, the sure sign that SBMS has something very different from IVHS and other high-capacity AVM

The best way to accomplish this, indeed the only way, Pinpoint submits, is through time-division multiple access. As Pinpoint explained in its opening comments, such sharing can be accomplished practically and economically.⁷ Of course, such demonstrations are anathema to PacTel Teletrac and MobileVision, which seek to convert their shared spectrum licenses into something far more valuable: exclusive, essentially nationwide, authorizations in 8 MHz of prime land mobile spectrum.⁸ Accordingly, both of these parties erect numerous "straw man" arguments in an effort to convince the Commission to adopt the *NPRM*'s alternative proposal: "temporary" exclusivity. As Pinpoint discussed in its opening comments, temporary exclusivity is indistinguishable from permanent exclusivity in the current circumstances because at least the top 50 markets would automatically go to PacTel and MobileVision under this proposal.⁹ Moreover, there is not a single thread of evidence in the comments of either party that they would willingly share, irrespective of feasibility.

PacTel is perhaps the more egregious in this regard, despite the purported focus on sharing issues in its thick pleading. Yet, for the most part, PacTel dwells on dispelling the prospects of co-channel, *simultaneous* operation by two wide-area

⁷ Comments of Pinpoint Communications, Inc., PR Docket No. 93-61, at 16-21 (filed on June 29, 1993) ("Pinpoint Comments").

⁸ Indeed, like PacTel and MobileVision, SBMS seeks exclusive licensing albeit on a slightly more modest scale. In its comments, it completely ignores the issue of time-sharing, assuming the need for exclusivity. Location Services, a licensee in a handful of markets also licensed to MobileVision, seems primarily intent on converting its licenses into exclusive holdings as well, but it neither engages the sharing issue -- ostensibly assuming exclusivity -- nor gives any indication of the types of services it would provide should it ever build out one or more of its licensed systems.

⁹ *Id.* at 12-14.

systems in the same geographic market. While PacTel's arguments in this regard unwittingly lend strong support for the feasibility of sharing by wide-area and local-area systems, as discussed,¹⁰ they are beside the point when it comes to the co-existence of wide-area systems. PacTel triumphantly points out Pinpoint's "concession" that sharing among wide-area systems cannot be accomplished under such simultaneous operation basis. However, Pinpoint has never contested that sharing among co-channel wide-band systems could be accomplished if operation were permitted to be simultaneous. Pinpoint's discussion of sharing, in contrast, focuses on where the real issue concerning sharing lies -- sharing through time division multiple access ("TDMA") to the band -- rather than ridiculing the Commission's proposal for sharing among wide-area systems.¹¹

¹⁰ See *infra* Section II.

¹¹ PacTel disingenuously contends that Pinpoint has conceded most of the technical points made by an engineer it had hired to review Pinpoint's applications for initial systems licenses in twenty cities. Comments of North American Teletrac and Location Technologies, Inc. (PacTel), PR Docket No. 93-61 at 28 n.31 (filed June 29, 1993) ("PacTel Comments"). In a trivial sense, Louis Jandrell, Vice President of Design and Development at Pinpoint, could be said to have agreed with many of the points made by Charles Jackson in an affidavit attached to Pinpoint's opposition to PacTel's application for a freeze on licensing, before Mr. Jandrell proceeded to explain the feasibility of sharing, which rests on entirely different premises than those addressed by PacTel's consultant. However, because those conceded preliminary points were irrelevant to the central technical issues raised by time-division sharing, Pinpoint fails to see the importance of the fact that Mr. Jandrell bypassed these superfluous issues to get to the heart of the matter: the Jandrell statement disagreed with Dr. Jackson on the fundamental issue of whether sharing among wide-area systems is now feasible through time-division multiple access.

PacTel defers entirely to the discussion presented in a study prepared by Dr. Raymond Pickholtz attached to its comments that purports to examine TDMA.¹² As Pinpoint explains below, Dr. Pickholtz fails to demonstrate the infeasibility of sharing.

Professor Pickholtz concludes off the bat that "[t]ime sharing . . . is an obvious approach,"¹³ but then proceeds to mischaracterize the situation, suggesting that time slices need be approximately one second in duration.¹⁴ As even Dr. Pickholtz's seemingly absurd example shows -- he assumes the possibility of a receive site *50 miles* from the mobile being involved in the position fixing -- flight times will be almost four orders of magnitude shorter than a second, about a quarter of a millisecond.¹⁵ The fact of the matter is that a typical separation between a base station and a mobile in a cluster should be an order of magnitude less, such that the flight times are more on the order of only a few tens of microseconds.

As noted earlier, Pinpoint has conducted field tests of its wide-area AVM system. Pinpoint's field results demonstrate that the pulse transmissions involved are on the order of 0.0002 seconds in duration. A position fix takes almost exactly one millisecond, from the time the base station "powers up" and polls the mobile until the receive sites in a cluster receive the mobile's pulsed transmissions and measure the

¹² PacTel Comments at app. 1 (R. Pickholtz, Engineering Analysis of Co-channel Pulse-Ranging LMS Systems) ("Pickholtz").

¹³ *Id.* at 27.

¹⁴ *Id.* at 27 n.28.

¹⁵ *Id.*

times of arrival. Accordingly, one thousand position fixes may be performed in one second in a single cluster of four or more receive sites.¹⁶ Thus, while Pinpoint agrees that "[s]econds are approximately the right duration of time slices, they could easily be a tenth of a second or less, depending on the desires of the sharing parties and the state of the technology employed."¹⁷

This extremely short time to complete a position fix underscores the ability of synchronized mobiles to make "asynchronous" requests, a feature over which PacTel and MobileVision have expressed a certain anxiety. Certain sub-slices of a licensee's time slice could be set aside for "high priority" "asynchronous" mobile requests, such as those involving a police emergency.¹⁸ The mobile would await the associated system's next available time slot and use the next "asynchronous" time slice to make its request, after which a position fix would occur within a few milliseconds. Under a typical time sharing regime with eight or ten sharers, the time elapsing between the request and the response need not be more than four or five seconds, and may easily be

appear asynchronous, while the system would wait until its next "asynchronous" time slot opened. The result would be identical to the sort of asynchronous operations described by PacTel and MobileVision.¹⁹

Professor Pickholtz identifies four issues that he maintains must be addressed before time-division could be adopted: rules, technical concerns, incentive issues, and the Commission's enforcement burden. Pinpoint will discuss each of these in turn.

1. Rules

As Pinpoint explained in its comments, sharing should be implemented by having all qualified applicants (tentative selectees) in a market that file within the appropriate filing window coordinate among themselves through a combination, as appropriate, of frequency division and time-sharing.²⁰ In the absence of a successful negotiation among the tentative selectees, each selectee would have access to the spectrum once it built its system for one-half second, every $N/2$ seconds, N being the number of tentative selectees constructing and operating systems.²¹

¹⁹ See Technical Appendix.

²⁰ Pinpoint Comments at 35-38. Pinpoint notes that the Commission recently adopted an approach to implementing PCS that involves negotiation among spectrum users in order to bring new entrants and services to the 2 GHz portion of the spectrum. See, e.g., Procedures Adopted For Emerging Technology Access To 2 GHz Spectrum, FCC Report No. DC-2463 (July 15, 1993) (FCC News Release).

²¹ Pinpoint Comments at 37.

Professor Pickholtz observes, as Pinpoint has, that carrier-sense multiple access will not work in a high-capacity AVM environment.²² He then identifies as workable, from the standpoint of rules, the methods previously discussed by Pinpoint: simple time-slicing on a round-robin basis or, at a more sophisticated level, "coordinat[ion of] the spectrum access by the individual systems" through a central control site.²³ This last method is what Pinpoint has characterized as the use of an "arbitrator".²⁴

Finally, Professor Pickholtz recognizes that the administrative burden due to the implementation of sharing would be far less for the Commission if the tentative selectees worked out the details of sharing pursuant to a rule such as the current Section 90.173(b), under which sharing has operated successfully for years.²⁵ Professor Pickholtz is concerned that this may lead to "uncertainty" down the road, but Pinpoint submits that, if sharing plans are subject to FCC approval and enforcement, concerns of "uncertainty" are not well-founded.²⁶

²² Pickholtz at 28.

²³ *Id.* at 29. Pinpoint agrees that the "token-passing scheme" alluded to by Professor Pickholtz is less desirable than the others. Technical Appendix.

²⁴ Pinpoint Comments at 18-19.

²⁵ 47 C.F.R. § 90.173(b) (1992).

²⁶ Pickholtz at 29.

2. Technical Issues

Having recognized the administrative and conceptual feasibility of sharing, Dr. Pickholtz suggests the need to address four technological issues, overhead transmissions associated with synchronization, rapid response requirements, support of asynchronous transmissions, and the use of very long-duration, low-power pulses.

Professor Pickholtz contends that the use of overhead transmissions for the synchronization and calibration of systems will be wastefully duplicated in a sharing environment.²⁷ Ignoring the capacity gains conferred on all systems if the wider bandwidths made possible in a full sharing situation are used -- which would reduce the relative proportion of spectrum dedicated to synchronization overhead -- Pinpoint's field results confirm overhead is likely to constitute less than 1% of airtime for a well-engineered system.²⁸ Given the exponential increase in capacity made possible by wider bandwidth²⁹ overhead will constitute an even smaller fraction of a percentage

Professor Pickholtz is also concerned that rapid response requirements be accommodated under a sharing regime. Again, a system operator's accommodation of such requirements is a matter to be resolved during negotiations by a group of tentative selectees, all of whom would presumably share the same concern, and prioritization within a firm's own time slots. Accordingly, an AVM firm could schedule its time slots and internally coordinate the use of the same to accommodate emergency request from motorists or police, for example, and acknowledgments thereof in a satisfactorily short time.³¹ In short, whether there is "an efficient tradeoff between applications requiring different performance characteristics" is a decision to be made by each tentative selectee. Failure to do so cannot be laid at the feet of time-sharing.

Finally, Professor Pickholtz complains that time-division approaches might limit the use of very long-duration, low-power pulses that might be used with small, covert transponders for law enforcement purposes. First, relatively high powered short pulse transceivers can be made small and powered from a vehicle. Second, even if there were difficulties in doing so, it would hardly make sense to sacrifice the more pressing and publicly beneficial uses of the band for high capacity IVHS applications for an inefficient low powered long pulse technology that is better suited for low noise virgin

³⁰(...continued)

force the system across this limit." Pickholtz at 30. This objection apparently postulates the ability of new systems to come into the market indefinitely in the future. Under Pinpoint's proposal, after the closure of an open filing window, no additional systems would be permitted. Accordingly, sharing negotiations should lead to a situation preventing any system from being forced across its maximum time limit without transmissions.

³¹ Pinpoint finds it incredulous that motorists requesting roadside aid would begin to panic if assistance is not provided in less than ten seconds, as Dr. Pickholtz implies. *See id.*

spectrum. In other words, the long-pulse, low-power "tail" should not wag the high-capacity AVM "dog."³²

3. Incentive Issues

Professor Pickholtz asserts that TDMA may create incentives to "cheat," and postulates the creation of "'new' entrants" by existing licensees sharing an allocation. The purpose of these new entrants would be to obtain more time slices for the existing licensee through the guise of "renting capacity" from that licensee.³³ He concludes that initial licensees "have an enormous incentive to create such additional firms to get an additional spectrum share and to deny capacity to their competitor."³⁴

Under Pinpoint's proposal, the situation postulated by Professor Pickholtz could not occur. All members in a sharing group would have to have their own applications demonstrating the intention and financial qualification to construct a separate system. No new licensees would be permitted after the filing window closes. Furthermore, while Pinpoint postulates that each system should be a stand-alone system, a limited amount of base station structures could be shared (but not transmitters and receivers) to

³² Similarly, a personal locator service seems incompatible with high-capacity IVHS applications and should not be permitted to be an obstacle to the same, particularly as there are other possible homes for personal location. See Technical Appendix.

³³ Pickholtz at 31. For example, if the band is shared by Firms A and B on an equal time basis, Firm A could create A-prime which would "rent" Firm A's system. Postulating that Firms A, A-prime, and B would share equally, each receiving one-third, Firm A would effectively have two-thirds of the time slices.

³⁴ *Id.*

take advantage of some efficiencies without reinjecting undesirable incentives into the sharing scenario.³⁵ Thus, those applicants who might be tempted to form settlement groups so as to pool their time and avoid installing their own separate transmitters and receivers could do so. However, the total time to the group would be limited to that which would have been available to one such applicant.

Nor will the incentives to innovate be stifled under time-sharing, certainly not to the extent they would be under an exclusive licensing regime. Indeed, PacTel itself is plainly aware that the absence of competition fails to create incentives to innovate, as one of its mobile affiliates explained to the Commission last week.³⁶ Moreover, the disincentives cited by Professor Pickholtz are not germane. The fact that some purported innovations may not operate in a time-division environment -- PacTel cites the example of low-power long-pulse battery-operated mobile units³⁷ -- does not mean that innovative ways cannot be developed in a TDMA regime to meet the same needs.³⁸

³⁵ While Dinnanzi does not believe a token sharing protocol yields the best sharing arrangement

Professor Pickholtz also suggests that there will be no incentive to increase capacity because the "lion's share" of the increase would be divided among a firm's competitors. While this might be true in a token-sharing scheme, it is absolutely false in the much more preferable time division approach where each system has the right to the spectrum for a specific and equal amount of time.³⁹ In the latter case, there is every incentive to improve efficiency and increase capacity. There may also be an incentive for a firm with excess capacity to sell or barter its spare capacity to others.

Dr. Pickholtz also suggests that incentives to remedy faults would be decreased.⁴⁰ This is utterly misplaced. In the first place, the failure to remedy known faults could lead to forfeitures and the revocation of licenses. In the second place, tort liability could follow from failing to locate (which should be easy to do) and shut down the faulty unit. In the third place, it is true in a simple-minded sense that to use a faulty, continuously-emitting transmitter will harm the "owner" who is one of three competitors for only one-third of the time than if the "owner" were the only operator, as PacTel's consultant suggests. However, the faulty unit would still

³⁸(...continued)

operates with enough power to get over the noise threshold, it could average over multiple time slots or devote most of a slot to such a long-pulse low powered application. The other problem with low powered long pulses is that they eat up tremendous amounts of spectrum resources -- obtaining a single fix could eat up the capacity equivalent to that needed for hundreds or even thousands of high power fixes.

³⁹ Even if in a sharing arrangement, one firm negotiated a right to more than its proportionate share of time, an increase in efficiency would not affect that right, and the firm would fully enjoy the

interfere with the "owner's" system 100% of the time it has access to the band. This seems incentive enough to remedy the fault. Accordingly, there is little substance behind the hyperbolic assertion in Dr. Pickholtz's study that TDMA "would thoroughly pervert incentives."⁴¹

4. Enforcement

As Pinpoint explained in its comments, under its proposal for implementing sharing, tentative selectees would negotiate sharing arrangements in each market and submit the agreed upon plans to the Commission for approval. In cases of interference among co-channel co-situated wide-area systems, the respective sharing plan would provide the "regulations" by which the FCC would resolve the conflict. In this manner, the FCC's enforcement burden will be minimized, yet well-defined and capable of swift application.

Professor Pickholtz suggests otherwise, contending initially that the FCC will have to determine if entrants are real or a sham. With strict construction deadlines, application requirements, and the long experience of the FCC in addressing such issues, only entities interested, qualified and capable of serving the public will survive and have a right to spectrum access. Dr. Pickholtz's other concerns, criteria for allotting time slots and mechanisms to verify compliance will be worked out in the sharing group negotiations.

⁴¹ *Id.*

* * * * *

In short, PacTel's arguments against TDMA, although embellished by impressive credentials, are transparently thin. At bottom, they say more about PacTel's unwillingness to share rather than the capability of wide-area systems to do so.

Similarly, MobileVision fails to demonstrate the infeasibility of sharing, but does so in an absolutely conclusorily manner. First, MobileVision questions the ability of systems to be synchronized with sufficient accuracy.⁴² However, GPS, for example, which Pinpoint has identified as one possible standard, allows synchronization to occur with a precision of a few hundred nanoseconds. Very moderate "time" guard bands, incorporated by each licensee within his own time slots, on the order of several milliseconds to accommodate flight times across a market, should be more than sufficient for efficient systems to maintain interference-free sharing.⁴³ Less efficient systems might require a millisecond or so, but the total percentage of capacity is still extremely low. In any event, because the "time" guardband would come out of an operator's own time slot, it would have a strong incentive to minimize the requisite guardband.

⁴² Comments of MobileVision, L.P., PR Docket No. 93-61 at 31 (filed June 29, 1993) ("MobileVision Comments").

⁴³ As noted earlier, a radio signal travels 50 miles in about one-quarter of a millisecond.

Second, MobileVision complains about the absence of true asynchronous requests.⁴⁴ As Pinpoint discussed above, an operator in a sharing environment can use synchronized transmissions to accommodate the needs for asynchronous transmission without a perceptible difference with respect to the user through use of a high capacity system technology, prioritizing, and set-asides.⁴⁵

In conclusion, there has been no showing that sharing is not feasible by any proponent of exclusivity. At most, the leading proponents of exclusivity have demonstrated their abhorrence to the notion of competition. Given the fantastic windfall that exclusivity would provide them. But as detailed in the following section, sharing would best serve the public interest and it is immediately feasible.

II. SHARING AMONG WIDE-AREA SYSTEMS IS IN THE PUBLIC INTEREST

In the *NPRM*, the Commission confirmed that the 1974 interim rules authorized sharing.⁴⁶ The *NPRM* goes on to conclude that continued sharing would remain in the public interest.⁴⁷ Not only do some commenters refuse to accept these conclusions,⁴⁸

⁴⁴ *Id.*

⁴⁵ MobileVision's Technical Appendix conclusorily states that sharing on a TDMA basis is impossible because a wide-area system operator must retain complete control over the spectrum. MobileVision Comments, tech. app. at 15-17. While MobileVision's Technical Appendix is non-descriptive and unsupported on this point, Pinpoint notes that under its time-sharing proposal, a wide-area operator will have complete control over the use of the spectrum during its time slot.

⁴⁶ *NPRM*, 8 F.C.C. Rcd at 2504 n.29.

⁴⁷ *Id.* at 2508.

but they continue to argue as they did in RM-8013 that exclusive licensing better promotes the public interest than spectrum sharing.

Like the contentions that sharing among wide-area systems is not immediately feasible, these arguments fall well short. Simply put, in their efforts to preserve a wide-area system duopoly, PacTel and other pro-monopoly wide area proponents would have the Commission defy both logic and the law. As described below, sharing provides a multitude of benefits, including the encouragement of continued innovation, increased competition, reduced charges and promotion of consumer choice. The assertions of PacTel and others to the contrary are entirely unconvincing, despite the forest of studies, reports, papers and vitae appended to the PacTel comments.

Attached hereto is an economic analysis by Wayne Stargardt, Pinpoint's Vice President, Marketing. As detailed below, Appendix C reveals that PacTel's economics are deeply flawed. Both under the classical economic theory upon which PacTel purports to rely, and on newer, more accurate analysis, PacTel's suggestion that the public interest favors monopolization or duopolization of the LMS marketplace is simply wrong. Rather, it is apparent after even the most cursory review that economics -- like regulatory policy and technology -- offers no justification for the sort of exclusivity PacTel and others demand.

⁴⁸(...continued)

⁴⁸ PacTel Comments at 24-32; Comments of Location Services ("LS"), PR Docket No. 93-61 at 4 (filed June 29, 1993).